

Patent Claims

- 1) Emulsifier-free microgel dispersed in the aqueous phase obtainable by
 - a) producing a polyacrylate (A) in the presence of at least one compound (B) exhibiting a phosphonic acid group, the polyacrylate (A) exhibiting at least one hydroxyl group and at least one carboxyl group;
 - b) crosslinking, in the aqueous phase, of the reaction mixture originating from step a) with an aminoplast resin (C);characterised in that the reaction mixture originating from step b) is not subjected to any subsequent emulsion polymerisation.
- 2) Microgel according to claim 1 characterised in that the polyacrylate (A) resulting from step a) is subjected, before step b), to an emulsion polymerisation with at least one monomer compound (D) which contains at least one free radical polymerisable double bond.
- 3) Microgel according to claim 1 or 2 characterised in that the polyacrylate (A) is obtainable by the polymerisation
 - of a monomer (i) with at least one polymerisable double bond and at least one hydroxyl group;
 - of a monomer (ii) with at least one polymerisable double bond and at least one carboxyl group; and
 - of a monomer (iii) without hydroxyl group and without carboxyl group with at least one polymerisable double bond.
- 4) Microgel according one of the preceding claims characterised in that compound (B) is an adduct of an alkyl phosphonic acid with a compound containing epoxy groups.
- 5) Emulsifier-free microgel dispersed in the aqueous phase obtainable by
 - a) producing a polyacrylate (E) by the copolymerisation
 - of a monomer (i) with at least one polymerisable double bond and at least one hydroxyl group;
 - of a monomer (ii) with at least one polymerisable double bond and at least one carboxyl group; and

- of a monomer (iv) with at least one polymerisable double bond and at least one phosphonic acid group;
- b) crosslinking, in the aqueous phase, of the reaction mixture originating from step a) with an aminoplast resin (C);
- characterised in that the reaction mixture originating from step b) is not subjected to any subsequent emulsion polymerisation.
- 6) Microgel according to claim 5 characterised in that the polyacrylate (E) resulting from step a) is subjected, before step b), to an emulsion polymerisation with at least one monomer compound (D) which contains at least one free radical polymerisable double bond.
 - 7) Microgel according to claim 5 or 6 characterised in that the copolymerisation is carried out in the presence of an additional monomer (iii) without hydroxyl group and without carboxyl group, which monomer exhibits at least one polymerisable double bond.
 - 8) Microgel according to one of claims 3 to 7 characterised in that the monomer (i) is selected from the group of hydroxyethyl(meth)acrylate, hydroxypropyl(meth)acrylate, hydroxybutyl(meth)acrylate and caprolactone esterified on the basis of hydroxy(meth)acrylate.
 - 9) Microgel according to one of claims 3 to 8 characterised in that the monomer (ii) is selected from the group of acrylic acid and methacrylic acid.
 - 10) Microgel according to one of claims 3 to 9 characterised in that the monomer (iii) is selected from the group of acrylic (meth)acrylic acid esters free from hydroxyl groups, and styrene.
 - 11) Microgel according to one of claims 5 to 10 characterised in that the monomer (iv) is vinyl phosphonic acid.
 - 12) Microgel according to one of the preceding claims characterised in that the aminoplast resin is a melamine resin.
 - 13) Microgel according to one of claims 2 to 4 or 6 to 12 characterised in that at least one monomer compound (D) contains no hydroxyl groups.

- 14) Microgel according to claim 13 characterised in that, additionally, at least one monomer compound (D) exhibits at least one hydroxyl group.
- 15) Microgel according to one of the preceding claims characterised in that it exhibits an acid number between 10 and 45 mg KOH/g.
- 16) Use of an emulsifier-free microgel dispersion according to one of the preceding claims for the production of a multilayer coating, in particular in the motor vehicle industry.
- 17) Use according to claim 16 for the production of a base coat.
- 18) Use according to claim 16 or 17 characterised in that the proportion of microgel, based on the solids of the layer obtainable therefrom is between 20 and 85%, preferably between 20 and 65%.